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PENETRATING ABDOMINAL TRAUMA; A PROSPECTIVE STUDY

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ABSTRACT... afsaralibhatti@hotmail.com **Objectives:** 1) To assess the effect of time, nature of injury and surgical procedure on the prognosis of patients presented with penetrating abdominal trauma 2) To formulate the recommendations for the management of penetrating abdominal trauma. **Design:** Prospective. **Setting:** Surgical Department of Jinnah Hospital, Allama Iqbal Medical College, Lahore. **Period:** November 2000 to May 2002. **Patients & Methods:** Sixty consecutive cases of penetrating abdominal trauma presented to surgical emergency were included in this study. Patients having chronic illness or associated injuries like head injury, chest injury, limb injury etc were excluded from the study. Proper history, thorough physical examination and necessary investigations were carried out. After initial resuscitation, exploratory laparotomy was performed in all cases of firearm abdomen. For stab abdomen, the indications for laparotomy included hypotension despite enthusiastic resuscitation, gas under diaphragm on plain x-ray abdomen, evisceration, omental protrusion or peritonitis. The pre and per-operative findings and surgical procedures were recorded. **Results:** Fifty five patients (91.67%) were male and five (8.33%) were female. Average age of the patients was 32.2 years. Twenty eight (46.67%) patients reached the hospital within three hours of the injury. Twenty two (36.6%) reached within 3-6 hours and ten patients (16.66%) reached hospital more than six hours after injury. Out of sixty patients forty three (71.67%) were firearm, fifteen patients (25%) were of stab wound and two patients (3.33%) were of road traffic accident. In 19 patients two or more organ system were damaged. Type of procedures performed included primary repair, right hemicolectomy, primary repair with diverting colostomy, resection and end to end anastomosis, Hartmann's procedure, Hepatorrhaphy, splenectomy, distal pancreatectomy, nephrectomy and repair of Kidney. Ten patients died. Post-operative complications included wound infection (24%), chest infection(13.34%), wound dehiscence (10.67%), fecal fistula (6.67%), burst abdomen(5.34%), subphrenic abscess(2.67%) and transient renal failure (1.34%). Most of the patients who arrived early in the hospital and treated promptly had less morbidity and mortality. **Conclusions:** Mandatory exploratory laparotomy for all gunshot and for the stab wounds penetrating the peritoneal cavity proves to be safe and prudent policy.

Key words: Penetrating abdominal trauma, Pneumoperitoneum, Laparotomy, Splenectomy, Hepatorrhaphy.

INTRODUCTION

Around 7% of the annual trauma deaths in U.K are a result of penetrating mechanism¹. Abdominal trauma make a sizeable portion of all trauma cases². The incidence of penetrating abdominal injuries continue to increase due to increased terrorism in our society and also due to ethnic clashes and territorial rifts. Such injuries may be caused by stab, gunshot and others. The clinical consequences of penetrating trauma are dependent on both energy transfer and anatomical factors.

The appropriate management of penetrating abdominal trauma depends upon a careful initial evaluation, timely use of diagnostic procedures and vigorous therapy directed to immediate life threatening problems³. In most instances, abdomen will need to be explored and in some large centers, protocols may permit local exploration of the stab wounds in the stable patients⁴. In the patient who has sustained gunshot wound, there is 95% probability that intra abdominal injury has occurred and plans should be made for immediate operation. Stab wounds are classified in thirds. One third do not penetrate the peritoneal cavity, one third penetrate but do not damage and one third penetrate causing significant injury⁵.

Patients with the penetrating abdominal trauma who is haemodynamically unstable despite adequate resuscitation or who is stable by resuscitating with repeated blood transfusion in short span of time, indicates severe intra abdominal bleeding and require immediate laparotomy⁶. Hollow abdominal viscera are the most effective organs following firearm injury. The morbidity and mortality have a direct relation with the number of injured organs⁷. Emergency laparotomy is crucial for early control of bleeding and to prevent secondary injury as a result of physiological splanchnic vasoconstriction

and free oxygen radicals⁸. The ultimate goal is to reduce the morbidity and mortality resulting from abdominal trauma through an organized plan of assessment and resuscitation.

MATERIAL & METHODS

Sixty consecutive patients with penetrating abdominal trauma were received in surgical emergency of Jinnah hospital Lahore from November 2000 to May, 2002 . All patients were resuscitated and managed in casualty department before shifting to surgical ward. Patients having associated injuries like head injury, chest injury, limb injury, chronic anemia or having medical problems like jaundice, diabetes mellitus, hypertension, coagulation disorder, chronic renal failure and congenital problems were excluded from the study. After receiving the patient in surgical emergency, primary survey and resuscitation was done immediately.

After resuscitation, secondary survey was performed. Detail history regarding complete bio data, mode and duration of injury was taken, thorough physical examination from head to toe was performed. Related investigations like blood complete examination, urine complete examination, blood grouping & cross matching, arterial blood gas analysis, serum electrolytes, blood sugar, serum urea/creatinine and serum amylase was done. Radiological studies like plain x-ray abdomen, ultrasound abdomen, C.T scan abdomen, Arteriography etc were done. Regarding management, vital signs were recorded every fifteen minutes, I/v fluids and blood transfusion were started. Patient was kept nil by mouth. Nasogastric intubation and urethral catheterization was done. Tripple regimen antibiotic cover (Ampicillin, Gentamycin and flagyl) was given. Intake output chart was strictly maintained.

For stab wounds, the indications for laparotomy was hypotension due to continues intra abdominal haemorrhage, gas under diaphragm on plain x-rays abdomen, omental protrusion, peritoneal irritation. The preoperative & per-operative findings and procedures were recorded. All informations were collected by a proforma. Data was entered in the computer soft ware SPSS. Data master sheet was created and data were analyzed. Simple frequency tables were generated for various variables and the cross tabulation was done to see the effect of time, nature of injury and surgical procedure on the morbidity and mortality of penetrating abdominal trauma patients.

RESULTS

Sixty consecutive patients with penetrating abdominal trauma were studied from November, 2000 to May, 2002, Fifty five patients (91.67%) were male and five (8.33%) were female (Table-I)

Sex	No. of Patients	%age
Male	55	91.67
Female	05	08.33
Total	60	100

Age Group (Years)	No. of Patients	%age
Below 20	12	20.00
20 - 40	29	48.33
40 - 60	19	31.67
Men Age = 32.2 years		

No person above the age of sixty was involved in this study. Mean age of the patient was 32.2 years. The majority was between 20 to 40 years of age (Table-II) Twenty eight (46.67%) patients reached the hospital within three hours of injury, twenty

two patients (36.67%) reached between three to six hours after injury and ten patients (16.66%) reached after six hours (Table-III).

Arrival Time (hours)	No. of Patients	%age
0 - 3	28	46.67
3 - 6	22	36.67
> 6	10	16.66

Site	No. of Cases	Management
Within Lahore city	17	28.33%
Outside Lahore city	43	71.67%

Type	No. of Cases	%age
Fire arm	43	71.67
Stab	15	25.00
Others	02	03.33

Seventeen patients (28.33%) were from within Lahore City while forty three (71.67%) were from rural area outside Lahore. (Table-IV)

Six patient (10%) of them had a pulse rate between 70-80 beats per minutes, thirty three patients (55%) had a pulse rate between 80-100 beats per minutes, while twenty patients (35%) had a pulse rate above 100 beats per minute. Forty three patients (71.67%) had received fire arm injury, fifteen patient (25%) had stab injury, while two patients got injured in road side accident (Table V). In forty one patients (68.33%) more then one liter blood was present in peritoneal cavity while in nineteen cases (31.67%) less then one liter blood was present.

Table VI: Site of injury and management performed

Site	No. of Cases	Management
Stomach	8	Primary repair
Duodenum	3	Primary repair
Jejunum & ileum	14	Resection & end to end anastomosis
Colon	11	Right hemicolectomy in three cases. Primary repair with diverting Colostomy in seven cases. Hartman's procedure in one case.
Liver	12	Hepatorrhapy in eight cases, pressure with a pack in four cases.
Diaphragm	04	Primary repair with prolene.
Spleen	05	Splenectomy
Pancreas	03	Repair in 02 cases, distal pancreatectomy in 1 case.
Retroperitoneal haematoma	03	Hematoma left as such.
Mesenteric tear	06	Repair
Rectum	03	Primary repair with diversion

Table VII: Complications Encountered

Type	No. of	%age
Wound Infection	18	24.00
Chest Infection	10	13.34
Wound dehiscence	08	10.67
Faecal fistula	05	6.67
Burst Abdomen	04	5.34
Leakage peritonitis	04	5.34
Subphrenic abscess	03	4.00
Pelvic abscess	02	2.67
Interior abscess	02	2.67
Transient haematuria	01	1.34

In 19 cases more than one organ system were damaged. Stomach was involved in 8 cases, jejunum and ileum was damaged in 14 cases, liver in 12 cases, Spleen in 5 cases, colon in 11 cases, diaphragm in 4 cases, pancreas in 3 cases and kidney in 3 cases.

More than 5 pints blood was transfused in 2 cases (3.3%), between 2 to 5 pints of blood was transfused in 43 cases (71.67%), one pint in 10 (16.67%) cases and no transfusion was required in 5 cases (8.33%).

Duration of stay in the hospital was less than 7 days in 12 cases (20%), seven to fourteen days in 34 cases (56.67%), and more than 14 days in 14 cases (23.33%). In whole tenure we had 10 deaths. Complications encountered are given in Table-VII.

DISCUSSION

There is great change in the management of penetrating abdominal trauma over the last 2-3 decades⁹.

In emergency department of our hospitals, the number of patients received with penetrating abdominal trauma are increasing day by day. We have a male dominant society and most of our females are house wives. This is the reason that males are more often involved in the environmental diseases, war, violence and street quarrels.

In this study male to female ratio was 11:1. Mostly the children and old age persons are considered harmless and are involved in warmly activities of the daily life.

No person above the age of 60 years was involved in this study. Mostly the patients were between 20 to 40 years of age. This is the age when blood is hot, arms are powerful and one is more courageous and relatively more quarrelsome^{10,11,12}.

Among the penetrating abdominal injuries a drastic change has been observed in the ratio of fire arm versus stab wounds during the last decade. Rathore¹¹ had reported 85% stab 15% fire arm injuries.

Another study conducted by Asif¹² reported 28 stabs versus 32 firearm injuries. In this study 71.67% penetrating abdominal injuries are due to firearm, 25% with stab and in only 3.33% cases road traffic accidents were the cause.

Time interval between injury and operation was six hours in a study conducted by Mihmanli⁹. Another study conducted in department of surgery, Helsinki university central hospital Finland¹³ reported this time to be 11 hours. In this study 46.67% patients reached the hospital within three hours of injury, only 16% reached hospital after 6 hours.

In this study triple regimen antibiotics were used. The regimen comprised a penicillin which was mostly Ampicillin, aminoglycoside and metronidazole for bacteroides fragilis¹⁴.

Different type of procedures were performed according to the nature of injury and organ involved. Most common postoperative complication was wound infection (24%).

Other common complications were chest infection and wound dehiscence. 60% of these severely injured patients remained complication free.

In a study conducted at the department of surgery

University of Kansas¹⁵, overall morbidity was 23% irrespective of the procedure performed, which is comparable.

It is concluded that morbidity of penetrating abdominal trauma depends upon duration between injury and arrival at hospital. It also depends upon number and type of organs injured resulting in septic load.

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